

REMARKS

The Final Office Action of December 31, 2003, and the Advisory Action that was mailed on March 24, 2004, have been received and reviewed.

Claims 1-20 are currently pending and under consideration in the above-referenced application. Of these, only claims 1, 3, 4, and 11-20 have been considered. Claims 2 and 5-10 have been withdrawn from consideration for being directed to a non-elected species of invention.

Claims 1, 3, 4, 11-13, and 15-20 stand rejected.

New claims 21-24 have been added.

The indication that claim 14 recites allowable subject matter is noted with appreciation.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 102

Each of claims 1, 3, 11-13, and 15-20 stands rejected under 35 U.S.C. § 102 for reciting subject matter which is purportedly anticipated by the prior art of record.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Additionally, the elements must be arranged as required by the claim, but identity of the terminology is not required. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

Yates

Claims 15-20 stand rejected under 35 U.S.C. § 102(e) for being drawn to subject matter which is purportedly anticipated by the disclosure of U.S. Patent 6,358,793 to Yates et al. (hereinafter “Yates”).

Yates describes processes for forming localized photomasks over semiconductor device structures, such as capacitor structures that include containers. Yates also describes that such processes may be effected without the use of abrasive processes such as chemical-mechanical

planarization (CMP). In those process, a layer of photoresist 45, 70, 75 (FIGs. 11, 12, and 17) is applied (*e.g.*, by conventional spin-on processes) to a substrate 5, 10 and within container holes 20, then selectively exposed to form the photomask within container holes. Col. 3, lines 49-51. The only portions of the photoresist that become polymerized during the disclosed process include those located “above the sidewalls of the hole[s]” and that within the holes, which is underexposed.” *See, e.g.*, col. 3, lines 61-65. The remainder of the photoresist is then removed. *See, e.g., id.*

Yates is silent as to whether or not the resulting mask has a surface which is “substantially free of hills and valleys.” With respect to previous arguments that the surfaces of the photoresist layers described in Yates are not substantially planar, the Office focused on the linear appearances of the upper surfaces of the photoresist layers 45, 70, 75 that are shown in the cross-sectional drawings of Yates (*e.g.*, FIGs. 11, 12, and 17).

M.P.E.P. § 2125 provides that “[d]rawings and pictures can anticipate claims if they clearly show the structure which is claimed,” but cautions that the “drawings must be evaluated for what they reasonably disclose and suggest to one of ordinary skill in the art.” This rule is based, at least in part, upon the holding in *In re Aslanian*, 200 USPQ 500 (C.C.P.A. 1979), in which the court directed “[w]e evaluate and apply the teachings of all relevant references on the basis of what they reasonably disclose and suggested to one skilled in the art . . .” In *Aslanian*, the court was evaluating the relevance of drawings of a design patent as prior art to the claims of a patent application. Relative dimensions were not at issue, indicating that the guidance provided by M.P.E.P. § 2125 merely discusses relative dimensions of features of an illustrated object as an example of something that may not be reasonably disclosed or suggested to one of ordinary skill in the art.

M.P.E.P. § 2125 also requires that arguments about illustrated drawing features, such as proportions and dimensions (*e.g.*, planarity or nonplanarity), are of little value when the specification does not indicate that the drawings may be relied upon for such a purpose. Neither the M.P.E.P. nor the relevant case law indicates, however, that an omission means that the subject matter illustrated in drawings must be taken at face value, as has been asserted at page 7 of the Final Office Action.

Yates has been relied upon for its depiction of the surface of a photoresist with straight lines. Notably, the straight lines that are shown in Yates do not represent any of the area of the surfaces of the depicted photoresist layers 45, 70, 75 but, rather, merely corners formed by the surfaces of the photoresist layers 45, 70, 75 and the cross-section planes that extend therethrough (*i.e.*, a single line across the surface of each photoresist layer 45, 70, 75). Before the priority date for the above-referenced application, however, one of ordinary skill in the art would have had no reason to believe or expect that such a straight line was representative of a planar surface. Rather, as is explained in the “Background” section of the above-referenced application and several of the references that have been made of record in the above-referenced application (*see, e.g.*, U.S. Patent 5,677,001 to Wang et al., col. 4, TABLE 1; U.S. Patent 6,117,486 to Yoshihara), one of ordinary skill in the art would have expected the surface of a prior photoresist layer, particularly a photoresist layer which overlies a nonplanar substrate surface, to have a variety of minuscule nonplanar features, including hills and valleys of different elevations and dimensions, angled surfaces between the hills and valleys, and the like. As those of ordinary skill in the art have recognized, such surfaces have primarily been illustrated as planar for the sake of simplicity.

Therefore, in view of the guidance that has been provided in M.P.E.P. § 2125, without further guidance from the specification of Yates, the mere inclusion of straight lines in the simplified drawings thereof does not indicate that surfaces represented by the straight lines are substantially planar or substantially free of minuscule nonplanar features, such as hills or valleys.

Further, in *In re Olson*, 101 USPQ 401 (C.C.P.A. 1954), the court recognized that, unless expressly indicated, “drawings which accompany an application for a patent are merely illustrative of the principles embodied in the alleged invention claimed therein . . .” In the case of Yates, the mere illustration of a surface of a photoresist layer with a straight line does not indicate that that surface is actually planar. Again, before the priority date for the above-referenced application, one of ordinary skill in the art would have had no reason to expect the surface of the photoresist layer shown in the drawings of Yates to have been substantially planar or substantially free of minuscule nonplanar features, such as hills or valleys.

Thus, Yates does not expressly or inherently describe that the surfaces of any of the photoresist layers (*e.g.*, layers 45, 70, and 75 shown in FIGs. 17, 11, and 12, respectively) thereof have surfaces which are substantially planar or substantially free of minuscule nonplanar features, such as hills and valleys.

In contrast to the subject matter which is actually described in Yates, the semiconductor device structure recited in independent claim 15 of the above-referenced application, as amended and presented herein, includes a material layer which at least partially fills a recess and has a surface which is substantially free of hills and valleys.

As Yates does not expressly or inherently describe that any of the photoresist layers described therein have surfaces which are substantially free of hills and valleys, it is respectfully submitted that, under 35 U.S.C. § 102(e), Yates does not anticipate each and every element of amended independent claim 15 and, thus, recites subject matter which is allowable over the description of Yates.

Each of claims 16-20 is allowable, among other reasons, for depending either directly or indirectly from claim 15, which is allowable.

Claim 20 is further allowable since Yates neither expressly nor inherently describes a material layer (*i.e.*, either the photoresist layer or the resulting mask layer thereof) that has a thickness which is less than the depths of the containers thereof. The relative dimensions shown in the drawings of Yates cannot be relied upon since Yates does “not disclose that the drawings are to scale and is silent as to dimensions.” M.P.E.P. § 2125.

Kikuchi

Claims 1, 3, and 11-13 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is assertedly anticipated by the subject matter described in U.S. Patent 6,278,153 to Kikuchi et al. (hereinafter “Kikuchi”).

The description of Kikuchi is much like that of Yates. Specifically, FIG. 6D of Kikuchi shows a semiconductor device structure includes a substrate 21, multiple material layers 23-27 formed on the substrate 21, and a via-hole 23a extending downwardly into the material layers 23-27. *See also* FIGs. 6A-6C; col. 16, line 48, to col. 17, line 61. A resist 20 is then

formed over the semiconductor device structure and within the via-holes 23a thereof. FIG. 6D; col. 17, line 62, to col. 18, line 2.

The specification of Kikuchi does not expressly or inherently describe that a surface of the resist 20 is substantially planar or substantially free of minuscule nonplanar features, such as hills and valleys. Again, it is respectfully submitted that, in view of the guidance provided by M.P.E.P. § 2125, reliance upon the drawings of Kikuchi is improper, since the specification does not indicate that the features (*e.g.*, straight lines) of the simplified drawings are to be taken at face value.

In contrast to the subject matter described in Kikuchi, independent claim 1, as amended and presented herein, recites a semiconductor device structure which includes a material layer disposed over a substrate, substantially filling at least one recess of the substrate, and having a surface which is substantially free of hills and valleys.

As Kikuchi is devoid of any express or inherent description that the resist layer 20 or any other layer described therein has a surface which is substantially free of hills and valleys, it is respectfully submitted that amended independent claim 1 recites subject matter which, under 35 U.S.C. § 102(e), is unanticipated by and allowable over the description of Kikuchi.

Each of claims 3 and 11-13 is allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Claim 13 is additionally allowable since Kikuchi neither expressly nor inherently describes a material layer (*i.e.*, either the resist layer or the resulting mask layer thereof) that has a thickness which is less than the depths of the via-holes 23a thereof. M.P.E.P. § 2125 clearly indicates that the relative dimensions shown in the drawings of Kikuchi cannot be relied upon since Kikuchi does “not disclose that the drawings are to scale and is silent as to dimensions.”

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 1, 3, 11-13, and 15-20 be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claim 4 stands rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is allegedly unpatentable over teachings from Kikuchi, in view of the subject matter taught in U.S. Patent 5,663,090 to Dennison et al. (hereinafter “Dennison”).

Claim 4 is allowable, among other reasons, for depending from claims 1 and 3, which are allowable. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection of claim 4 is respectfully requested.

Allowable Subject Matter

The indication that claim 14 recites allowable subject matter is noted with appreciation. As the claims from which claim 14 depends are also believed to be allowable, claim 14 has not been amended to independent form.

New Claims

New claims 21-24 have been added.

New claims 21 and 23 respectively depend from claims 1 and 15, and recite that the surface of the material layer of the semiconductor device structure is free of abrasive-planarization-induced defects.

New claims 22 and 24 depend from claims 1 and 15, respectively, and recite that the surface of the material layer of the semiconductor device structure is substantially planar.

Allowance of these claims is respectfully solicited.

Election of Species Requirement

As each of claims 1, 3, 4, and 15-20 remains generic to all of the species of invention that have been identified by the Office, it is respectfully requested that claims 2 and 5-10 be considered and allowed. M.P.E.P. § 806.04(d).

CONCLUSION

It is respectfully submitted that each of claims 1-24 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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